

High Volume Density Polycrystalline Diamond With Working Surfaces Depleted Of Catalyzing Material

Abstract

Disclosed is a method for manufacturing a polycrystalline diamond or diamond-like element with greatly improved wear resistance without loss of impact strength. These elements are formed with a binder-catalyzing material in a high-temperature, high-pressure (HTHP) process. The PCD element has a body with a plurality of bonded diamond or diamond-like crystals forming a continuous diamond matrix that has a diamond volume density greater than 85%. Interstices among the diamond crystals form a continuous interstitial matrix containing a catalyzing material. The diamond matrix table is formed and integrally bonded with a metallic substrate containing the catalyzing material during the HTHP process. The diamond matrix body has a working surface, where a portion of the interstitial matrix in the body adjacent to the working surface is substantially free of the catalyzing material, and the remaining interstitial matrix contains the catalyzing material. Typically, less than about 70% of the body of the diamond

matrix table is free of the catalyzing material.